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Item no. 3475

STANDARDS DEVELOPMENT BRANCH THREE YEAR PLAN FOR STANDARD-SETTING INFORMATION DRAFT

PURPOSE

The Ministry's primary role is to set ... tough rules and standards and will ensure that they are met. It will encourage innovative approaches to meet those rules and standards.

(Page 7, May 1996 Business Plan of the Ministry of Environment and Energy)

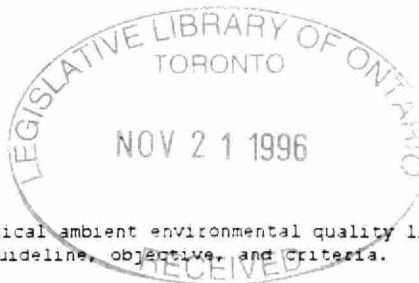
The Ministry of Environment and Energy (MOEE), through the Standards Development Branch (SDB) sets environmental quality standards¹ to protect human health and the ecosystem. Standards are developed for air, soil, ground water, surface water, drinking water, sediment and biota. The Ministry has identified its priorities in this area and a DRAFT plan which identifies standards which need to be established or revised over the next three years has been developed. The Ministry is seeking comments on the draft plan from stakeholders and would welcome any interest from potential partners willing to be involved in developing specific standards or contributing information in this regard.

A major challenge facing the Ministry is the need to deliver an increased number of scientifically sound environmental standards in a cost effective manner. As such the Ministry is actively adopting standards from other jurisdictions and encouraging joint development of standards through partnership with other regulatory agencies, the regulated community and other stakeholders to avoid duplication of effort and to make the best use of available resources and information. If these avenues are not possible then in-house development would be undertaken.

Early consultation is being undertaken to ensure that all the relevant information is considered during the development process; to provide an opportunity to discuss and clarify the priority needs; and, for advance notification as to which standards are under review or development.

Part A of this document provides a brief description of the uses and types of standards set and the general standard-setting process. Part B describes the consultation process which will be used to establish and revise the list of candidate substances for standard-setting.

¹ The term "standard" used in this document includes any numerical ambient environmental quality limit set by the ministry. In this context, "standard" is synonymous with guideline, objective, and criteria.



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PART A

DESCRIPTION OF STANDARDS

MOEE develops standards to make environmental management decisions. These standards define acceptable or desirable environmental quality to safeguard human health and the ecosystem. Standards are established to prevent adverse effects on the most sensitive receptors (human or ecological). The Ministry's standard-setting procedures also take into account multi-media considerations in recognition of the fact that some contaminants can move through the environment, persist for long periods, and/or accumulate in the food chain; and, that receptors can be simultaneously exposed to more than one pathway.

In keeping with MOEE's Statement of Environmental Values (under the Environmental Bill of Rights [EBR]) the Ministry will exercise a precautionary approach in its decision-making. Especially when there is uncertainty about the risk presented by a particular pollutant or classes of pollutants, the Ministry will exercise caution in favour of the environment. In addition, MOEE takes into account economic and technical considerations either in the development of these standards, or in their site-specific application. Consultation is undertaken with stakeholders, including industry, prior to approval.

Uses

Specific uses of standards within the Ministry include:

- ensuring protection of air quality, surface water and drinking water;
- establishing discharge limits from municipal and industrial sources in a Certificate of Approval (C of A) or other legal control instrument;
- assessing need for or adequacy of clean-up of soils and sediment in relation to spills or historic contamination such as in the Areas of Concern or the decommissioning of an industrial site;
- assessing general environmental quality and trends from surveillance and monitoring data;
- evaluating environmental assessment project impacts; and
- supporting investigations and enforcement activities where environmental harm has occurred.

Types

Over the last 20 years Ontario has developed a comprehensive set of standards. Key standards are:

- Air Standards, Criteria and Guidelines
- Ontario Drinking Water Objectives
- Provincial Water Quality Objectives
- Biota Guidelines
 - Tissue Residue Guidelines
 - Vegetation [Upper Limits of Normal]
 - Sports Fish Consumption Advisories
- Provincial Sediment Quality Guidelines
- Soil and Ground Water Criteria for Use at Contaminated Sites in Ontario
- Ontario Typical Range for Soils
- Compost Guidelines
- Sewage Sludge Guidelines

In addition, the Ministry is in the process of developing Soil Quality Criteria to assist in decisions regarding the placement/disposal of contaminated soil and soil-like materials.

A description of the existing standards is provided below:

Air Standards

Ontario has point of impingement (POI) limits and corresponding ambient air quality criteria. Ambient air quality criteria are established to protect human health, other environmental receptors (primarily vegetation) and prevent odours. These criteria are used to assess the quality of the ambient environment and for use in control orders, but are not directly enforceable. The POI limits, however, which are derived from the ambient air quality criteria, and are prescribed in Regulation 346 are directly enforceable. POI limits specify the maximum 1/2 hourly average ambient air concentrations that are permitted for various chemicals and are used to calculate the allowable amount of emissions from a source. These limits are developed by the Ministry as a basis for approvals, compliance and enforcement and create a level playing field for industry.

Ontario Drinking Water Objectives

Ontario's drinking water objectives are generally adopted from the Canadian Drinking Water Guidelines. These national guidelines are developed through a federal-provincial-territorial process through which Health Canada is responsible for undertaking the risk assessment component while the provinces are responsible for

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the risk management aspects which involve evaluating the technical feasibility and economic considerations of applying the objective in that province.

Provincial Water Quality Objectives

Provincial water quality objectives are maximum desirable concentrations of chemicals which ensure that surface waters are satisfactory for aquatic life and recreation. They are developed with a margin of safety to protect the most sensitive aquatic life-stage of an organism for an indefinite exposure. Technical feasibility and economics are considered on a case-by-case basis in the Ministry's approval process for individual discharges.

In the past, MOEE has developed the majority of its water quality objectives internally, however, future objectives will be adopted or developed in partnership through the national Canadian Water Quality Guideline Task Group which reports to the Canadian Council of Ministers of the Environment (CCME). In general, MOEE objectives are comparable to guidelines developed through the national CCME process.

Provincial Sediment Quality Guidelines

Provincial Sediment Quality Guidelines provide three management levels - the no-effect level (or background), the lowest effect level and the severe effect level. These levels are derived from actual field data on the presence or absence of sediment-dwelling organisms with various levels of contaminants in sediment. The guidelines are used in remedial action plans and to determine how to manage dredged material or whether material can be placed in water such as for the creation of lakefills.

Future objectives will be adopted or developed in partnership through the national Canadian Water Quality Guideline Task Group which reports to the Canadian Council of Ministers of the Environment.

Ontario Typical Range (OTR)

The MOEE has developed a methodology to determine the normal range in chemical concentration for soils, vegetation, moss bags and snow across the province. The values that are developed from this new (1993) process will eventually replace the former Upper Limits of Normal (ULN) guidelines. The OTR is established to provide guidance to MOEE staff in the assessment of contamination arising from air and soil borne emissions to the environment and to assist in the development of other background-oriented guidelines for the disposal of waste soils and like-materials, the application of compost to soils and for the clean-up of contaminated sites via a background approach.

Biota Guidelines

There are three different types of biota guidelines developed or adopted by MOEE. These are designed to protect wildlife and aquatic organisms; vegetation; and human health, respectively.

- Aquatic organisms and terrestrial wildlife that feed upon them are protected by Tissue Residue Guidelines (TRGs). TRGs are acceptable concentrations of chemicals in aquatic organisms which ensure that wildlife (birds and mammals) which eat those organisms will be protected. They are developed with a margin of safety to protect the most sensitive wildlife which consume aquatic life for a lifetime exposure.

The protocol for developing TRGs is currently being developed through the Canadian Council of Ministers of the Environment Water Quality Guideline Task Group. Once approved, CCME will use the protocol to develop TRGs for critical toxic, persistent and bioaccumulative substances.

- Vegetation on agricultural and residential lands are protected against toxicity resulting from uptake of contaminants in soil through phytotoxicity-based soil guidelines. MOEE also has set Upper Limits of Normal for soil to assist in the interpretation of environmental monitoring data collected in the vicinity of airborne emission sources. These will be superseded by the "Ontario Typical-Range" (OTR) guidelines for soil that are now under development.
- Ontario sport fish consumption advisories apply to anglers who consume moderate quantities of their catch. These advisories are published in the Guide to Eating Ontario Sport Fish. Ontario's advisories are based on guidelines developed by Health Canada.

Health Canada has developed guidelines for a large number of contaminants but only five contaminants or groups of contaminants result in the majority of sport fish consumption restrictions. These are mercury, PCBs, mirex, dioxins/furans, toxaphene and DDT.

Soil and Ground Water Criteria for Use at Contaminated Sites in Ontario and Soil Quality Criteria

Soil and ground water criteria have recently been established to provide guidance to proponents and stakeholders in cleaning up contaminated sites in Ontario. The criteria serve as clean-up goals or targets and provide flexibility to proponents based on existing and future land and ground water uses of an area. These criteria allow proponents to voluntarily proceed with assessing and remediating their sites without the need for government supervision or costly site-specific risk assessment. The new

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guidelines also offer proponents the option of developing site-specific criteria if the generic criteria do not meet their specific needs.

The criteria also assist proponents and the Ministry in making decisions on whether a site must be remediated. These decisions are made on a case-by-case basis and require a determination of whether or not adverse effects are occurring on the property or in areas off-site.

In addition to the set of decommissioning criteria, the Ministry is proceeding with the development of soil quality criteria to assist in decisions regarding the placement/disposal of contaminated soil and soil-like materials. This will help divert some of the construction fill and other marginally contaminated materials from landfill waste disposal sites and provide additional options for placement.

Compost Guidelines

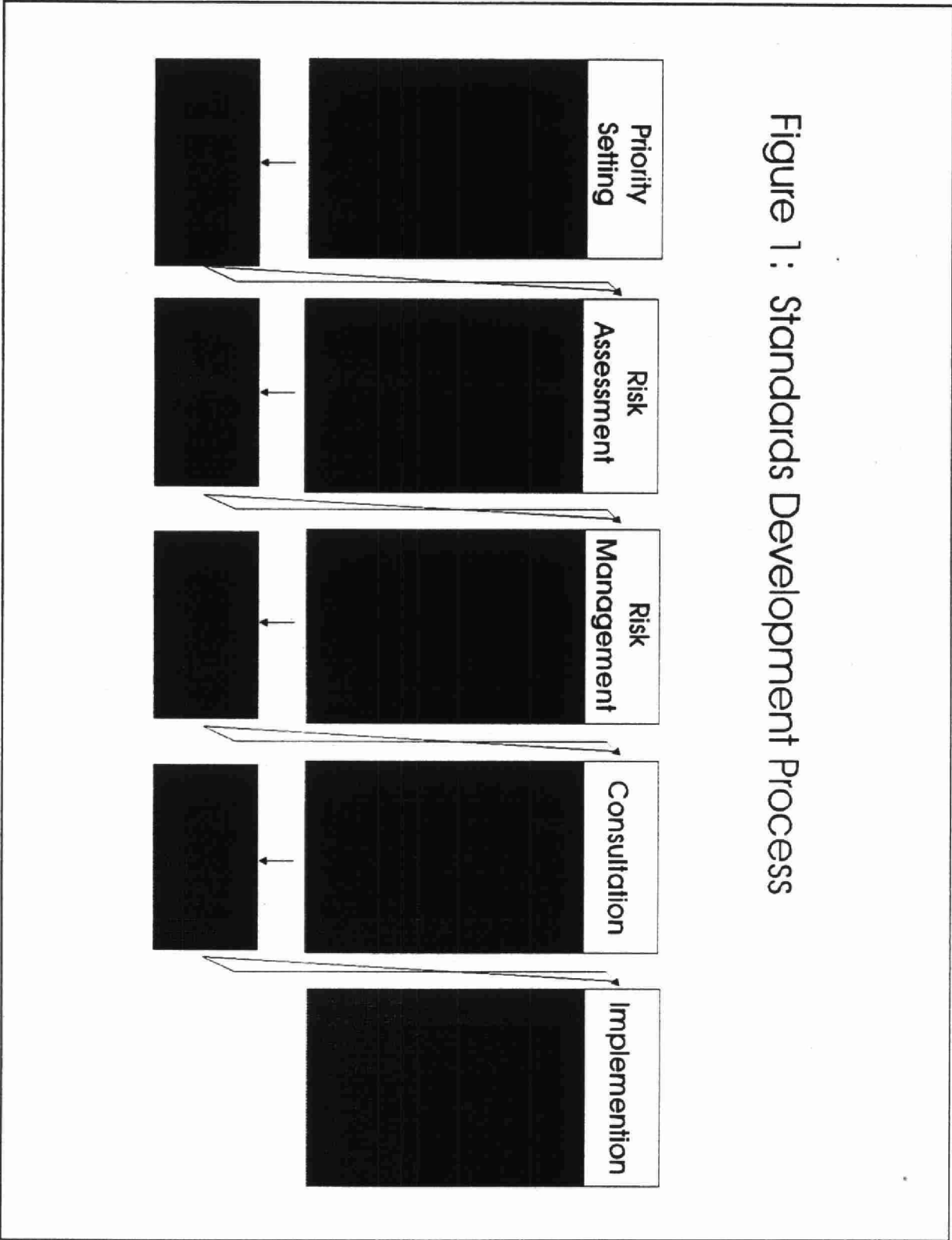
The Ministry has established *Interim Guidelines for the Production and Use of Aerobic Compost in Ontario* (1991) and in Regulation 101/94. Criteria levels are available for trace metals and these now require re-assessment due to changes in other criteria on which they were based. The Canadian Council of Ministers of the Environment is currently finalizing a national guideline for metals in compost, and these will be assessed as part of the revision process.

Sewage Sludge Guidelines

A set of sewage sludge application guidelines for agricultural lands has been developed by a joint effort through the MOEE/OMAFRA (Ontario Ministry of Agriculture, Food and Rural Affairs) Biosolids Utilization Committee. Membership on the committee consists of staff from the two lead ministries plus the Ministry of Health, the Wastewater Technology Centre, Brock University, the University of Guelph, the Municipal Engineers Association, the association of Local Official Health Agencies, sludge haulers and the Ontario Federation of Agriculture. The guideline currently covers metals. Additional elements/compounds are under consideration for future guideline development.

STANDARDS DEVELOPMENT PROCESS

Standards are developed through the multi-step process described below and summarized in Figure 1. This process governs all standard-setting options used by the Ministry i.e. adoption, following careful review of standards of other jurisdictions; partnerships with other agencies and stakeholders; and, standards developed in-house.



(1) Priority Setting

There are a number of priority setting factors used by the SDB based on:

- needs identified to support various Ministry programs (as discussed earlier under Uses);
- consideration of various lists such as the National Pollutant Release Inventory;
- meeting MOEE commitments to priorities of federal/provincial standard-setting working groups;
- reviewing ministry standards in response to new information related to environmental/human health effects; and
- a preliminary evaluation of risk posed by the candidate substance.

Since candidate substances requiring standards exceed the resources available to set standards, the initial priority list is further refined based on the degree of risk presented from exposure to various chemicals and in consultation with clients and stakeholders.

(2) Risk Assessment

Risk assessment is the scientific evaluation of the likelihood of the occurrence of adverse health effects due to exposure of a human or non-human organism to a physical, chemical or biological agent. Risk assessment consists of four major steps. **Hazard identification**, describes the type of adverse effect associated with the agent using existing scientific literature. **Dose-response assessment** determines the relationship between the amount of exposure and the probability of the adverse effect. For effects in human populations such as cancer, the outcome is expressed as the probability of developing cancer associated with a given exposure level over a lifetime. Most regulatory agencies consider lifetime cancer risks in the range of one in one million to one in one hundred thousand as being "essentially negligible". For other effects such as developmental effects, neurotoxicity or weight loss, the dose-response information is used to develop an exposure level below which adverse effects are not expected to occur. In **exposure assessment**, the concentration, frequency, duration and route of exposure of the organism to the agent are determined. In **risk characterization**, Ontario-specific or relevant exposure and dose-response information are used to characterize the nature and magnitude of the risk in the province. The risks to the general population or segments of the population of greatest concern are determined, including an assessment of

the uncertainties associated with those estimates. Risk assessment may be undertaken at a provincial level or at a local level, depending on the nature of the problem that is being assessed.

(3) Risk Management

Setting a standard is a risk management policy decision which integrates information from the risk assessment (i.e. potential for adverse effects as well as any measures of uncertainty) with economic and technical feasibility considerations. It is recognized that adverse effects may be associated with very low levels of some contaminants. Where implementation of a proposed standard would require significant costs to achieve, a cost-benefit analysis is carried out. This information is used to develop implementation options for the standard. Risk management analyses are used in setting province-wide standards (e.g. air and drinking water standards) and consider all major sources of environmental releases. Risk management analyses are also used in applying a standard on a site-specific basis (e.g. application of surface water quality objectives after considering site-specific and local source characteristics). Public consultation is part of the risk management process.

Risk management considerations in MOEE's environmental standard-setting process are intended to provide for flexibility, fairness, economic efficiency, and effectiveness in achieving environmental protection goals and do not prescribe how regulated sectors will meet the standards.

(4) Consultation

The ministry is placing The Three Year Plan for Standard-Setting on the Environmental Bill of Rights (EBR) Registry, to provide the public the opportunity to comment on the document. Regular updates will also be placed on the EBR Registry.

When setting individual standards formal public consultation is required and the proposed standard is placed on the EBR Registry for public comments. These comments are considered and the standard is revised where appropriate. Notice of the final standard, a summary of the comments received and actions taken with respect to the comments are placed on the EBR Registry as required, in a Notice of Decision.

PART B**THREE YEAR PLAN FOR STANDARD-SETTING**

To set priorities and co-ordinate standard-setting activities, MOEE has prepared a draft standard-setting plan for discussion and comment. The draft plan, in the form of a summary list is provided at the end of this document. The summary list outlines the candidate chemicals from which substances will be selected for standards development over the next three years. Chemicals are categorized by type of standard (ie air, drinking water etc) and listed alphabetically within the category. The Chemical Abstract Registry Number (CAS) is also provided. As can be seen on the list, a number of standards are already under development, while others are to be initiated.

COMMENTS SOUGHT FROM STAKEHOLDERS

The Ministry welcomes your comments on the Three Year Plan and specific questions you may wish to consider include:

- Are there other more important priority substances for new or revised standards? Why? (A list of current standards is available upon request at address noted below).
- Would you like to be a partner in the development of any of these standards? This could include submission of relevant scientific literature or studies, preparing and submitting expert reviews of relevant information in accordance with the Ministry's standards development procedures, and undertaking peer review of Ministry documents.
- Are you aware of other information or other considerations that MOEE should take into account in establishing the plan or in setting specific standards?
- Any other comments or suggestions?

It is proposed that the Three Year Plan will be published annually. Parties expressing interest in specific standards will be contacted during the development of that specific standard.

For further information contact:

Standards Development Branch
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Phone: (416)-323-5095 Fax: (416)-323-5166

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LIST OF STANDARDS IN PROGRESS

AIR

Acetaldehyde ✓
 Arsenic ✓
 1,3-Butadiene
 Cadmium ✓
 Carbon tetrachloride ✓
 Carbon monoxide
 Chromium VI ✓
 Cyclohexane
 1,2-Dichloroethane ✓
 1,4-Dichlorobenzene ✓
 Dioxins
 Fluorides (HF)
 Formaldehyde ✓
 Heptane ✓
 Inhalable particulates: ✓ PM10, 2.5
 Mercury ✓
 Methylene chloride ✓
 Nickel ✓
 Ozone
 PAH
 Styrene ✓
 Tetrachloroethylene ✓
 Total reduced sulphur ✓
 Trichloroethylene ✓
 Uranium

DRINKING WATER

Aldicarb ✓
 Aluminum
 Antimony
 Arsenic ✓
 Bacteriological quality
 Bromate
 Chloramines ✓
 Cyanide ✓
 1,1-Dichloroethylene ✓ (Vinylidene chloride)
 Fluoride
 Formaldehyde
 Lindane ✓

DRINKING WATER (cont.)

Microcystin-LR
 Protozoa (cryptosporidium, giardia)
 Radionuclides ✓
 Temephos ✓
 Tetrachloroethylene ✓ (Perchloroethylene)
 Total dissolved solids ✓
 Triallate ✓
 Tritium ✓
 Uranium
 Viruses

SURFACE WATER

Arsenic ✓
 Benzene ✓
 Cadmium ✓
 Carbaryl ✓
 Chlorobenzenes ✓
 Chlorophenols ✓
 Chromium
 Dioxins/furans ✓
 Inorganic lead
 N-Nitrosodimethylamine
 PAH ✓
 Vanadium

SOIL

Guidelines for management of excess soil¹

¹ Contact Standards Development Branch for complete list of chemicals

✓ - scheduled for completion in 96-97

THREE YEAR PLAN CANDIDATE SUBSTANCES
FOR STANDARDS DEVELOPMENT 1996-99

AIR

Acetone
Acetonitrile
Acrolein
Acrylonitrile
Aliphatic polyisocyanate
Ammonia
Asbestos
Benzene
Butanol, n-
Carbon dioxide
Chlorine
Chloroform
Cyclohexanone
1,1-Dichloroethylene (Vinylidene chloride)
Diethylamine
Diethylene glycol monobutyl ether
Diethylene glycol monobutyl ether acetate
Diethylene glycol monoethyl ether
Diethylene glycol monoethyl ether acetate
Dimethylamine
Dimethyl adipate
Dimethyl glutarate
Dimethyl succinate
Dimethyl ethanolamine
Dimethyl formamide
Dipropylene glycol methyl ether
Ethanolamine
Ethylbenzene
Ethylene
Ethylene glycol
Ethylene glycol butyl ether
Ethylene glycol butyl ether acetate
Ethylene glycol ethyl ether
Ethylene glycol ethyl ether acetate
Ethylene glycol monohexyl ether
Ethylene glycol monopropyl ether
Ethyl ether
Hexane
Hexyl acetate
Isobutyl acetate
Isopropyl acetate
Isopropyl benzene (cumene)
Isopropyl alcohol
Limonene
MMT
Manganese compounds
Methanol

AIR (cont.)

2-Methoxyethanol
1,2,4-Methylbenzene
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl n-propyl ketone
Mineral spirits
Morpholine
N-Nitrosodimethylamine (NDMA)
Nitrocellulose
Nitrogen oxides
Pentenediol monoisobutrate
Pentyl propionate, n-
Propionaldehyde
Propyl alcohol
Propylene glycol methyl ether
Propylene glycol methyl ether acetate
Propylene oxide
Quinoline
Sulphur hexafluoride
Sulphuric acid
Toluene
Total VOCs
Total hydrocarbons
Triethylamine
Uranium
Vinyl acetate
Xylene (mixed isomers)
Vinyl chloride

Italics - out of date, review for possible revision

THREE YEAR PLAN CANDIDATE SUBSTANCES FOR STANDARDS DEVELOPMENT 1996-99

DRINKING WATER

Beryllium
Bismuth
Cadmium
Chlorine
[(4-chloro-o-tolyl)oxy]acetic acid (MCPA)
Cobalt
Copper
Dichloroprop
EDTA
Manganese
Mercury and methyl mercury
Nickel
Organotins
Total petroleum hydrocarbons
1,1,1 Trichloroethane
Trichloroethylene

SURFACE WATER

Ammonia & nitrates
Chlorine
Copper
Cyanide
Dissolved oxygen
Fluoride
Hexachlorobutadiene
Mercury
Phosphorus
Phthalates
Selenium
Substituted phenols and phenol
Suspended solids
Temperature
Total dissolved solids
Xylene
Zinc

AQUATIC SEDIMENT

Barium
Dioxins/furans
Selenium
1,2,4-Trichlorobenzene
1,3,5-Trichlorobenzene

TISSUE RESIDUE

Dioxins/furans
Mercury
Mirex
PAH
PCB
Toxaphene

COMPOST

Arsenic
Cadmium
Cobalt
Chromium
Copper
Mercury
Molybdenum
Nickel
Lead
Selenium
Zinc

Italics - out of date, review for possible revision

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